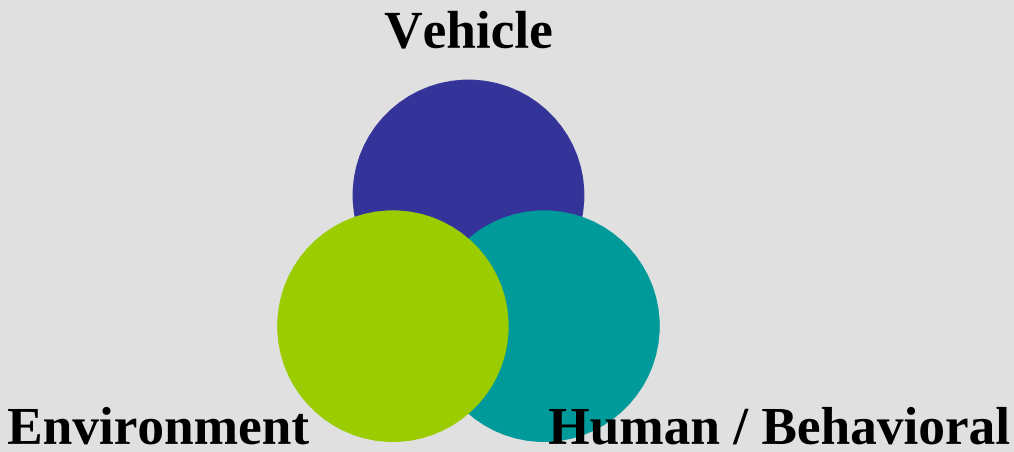
Harley-Davidson's Support of Motorcycle Safety

Wayne Curtin – Director, Government Affairs

The Harley-Davidson Approach to Motorcycling Safety

- Integration of three factors:



Focusing on any one, without consideration of the impact on the other elements often leads to ineffective or inefficient solutions, and lack of market acceptance.

Sources of Data & Input

- Motorcycle safety organizations
- Activities in other road safety organizations
- Consumer input / feedback
- Internal R&D
- Internal test rider feedback
- Government data and studies

Harley-Davidson's Support of Motorcycle Safety

- Motorcycle Safety Organization Activities
  - Multiple leadership positions
- Volunteer State Safety Coordinators
- Helmet donations to Rider Education Sites
- Harley Owners Group® (HOG) ® Member Training Reimbursements
- Rider's Edge® - The Harley-Davidson Academy of Motorcycling
- Active in Development of Harmonized Global Technical Regulations through WP29

Harley-Davidson's Membership in Motorcycle Safety Organizations

- Founding member of the Motorcycle Safety Foundation (MSF)
- Corporate member of the National Association of State Motorcycle Safety Administrators (SMSA)
- Ongoing Activities with NHTSA & FHWA
  - Quarterly Motorcycle Safety Network Meetings
- Transportation Research Board
- Society of Automotive Engineers
- Several Industry safety associations

Volunteer State Safety Coordinator Activities

The VSSC consists of 15 Volunteer State Safety Coordinators who assist in promoting safety to our customers.

Summary of 2005 activities

- Supported 20 State HOG Rallies.
- Made 115 safety presentations at HOG Chapter Meetings.
- Had over 1,100 contacts with HOG Chapters.
- Facilitated 61 Guide to Group Riding courses.
- Made 35 presentations of MSF's Riding Straight module.
- Presentations to 66 Civic and Other Motorcycle Organizations.

Helmet Donations to U.S. Rider Education Sites

- Initiated helmet donation program in 1977
- Have donated helmets valued at over $300,000 through 2005

HOG® & BRAG ® Member Reimbursement for Rider Education

Since their inception, the Harley Owners Group and the Buell Riders Adventure Group have offered to reimburse members for part of their costs incurred for taking rider education courses.

Members reimbursed since 1990	
1990 – 1995	13,880
1996 – 2000	26,159
2001 – 2005	33,871
	73,910

Rider's Edge® - The Harley-Davidson Academy of Motorcycling

This corporate and dealer funded Academy currently has several educational offerings.

- **Rider's Edge New Rider Course** (launched in 2000)
  - Nearly 90,000 students trained since launch
- **Rider's Edge/MSF Guide to Group Riding** (launched in 2002)
  - Sold materials for over 8500 participants
- **Rider's Edge Skilled Rider Course** (launched in 2004)
  - 749 students in 2005
- **Operational in United Kingdom Since 2000**
- **Exploring Other International Opportunities**

Market Awareness

- **Motorcycle safety organizations**
- **Activities in other road safety organizations**
- **Consumer input / feedback**
- Internal R&D
- Internal test rider feedback
- Government data and studies

Each of the aforementioned activities provides Harley-Davidson the opportunity to discuss safety matters with consumers and experts alike, and identify areas with the most potential for improvement.

  - This includes possible vehicle design changes that are likely to be accepted in the marketplace.

Internal R&D

- Product Validation Testing
  - Approximately **3 Million** miles of “on road” testing per year
    - Roughly 600,000 miles per vehicle platform
  - Around **2.3 Million additional** miles accumulated on full vehicle test stands
  - 443 full-time salaried and union employees dedicated to testing
    - Includes 126 involved in lab testing and 218 others at full vehicle test sites
    - Does not include contractors, facilities or maintenance support
  - Customer driven feedback
    - Test riders (the most discriminating customers) shift by shift feedback
- 104 Years of Motorcycle Development Experience

Internal R&D

- Motorcycle safety organizations
- Activities in other road safety organizations
- Consumer input / feedback
- **Internal R&D**
- **Internal test rider feedback**
- Government data and studies

Harley-Davidson emphasizes and seeks feedback from its own internal resources. These include beginning and professional riders, subject matter experts, and avid motorcycling fans, trained to be highly discriminating.

  - Participation in external groups and events is encouraged
  - Processes capture and leverage their insights are heavily utilized

Government Data & Studies

- The major Motorcycle Crash Causation studies are relied on as a basis for any discussion.
  - **The “Hurt Report”**
    - Last major US study, conducted 1976-1983
  - **The European MAIDS project**
    - Utilized the OECD Common Methodology
    - Co-funded by the European Commission, along with European riders organizations (FIM, FEMA), Harley-Davidson & other manufacturers
    - Expanded on the work pioneered by Professor Hurt

Government Data & Studies

- Motorcycle safety organizations
- Activities in other road safety organizations
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- Internal test rider feedback
- **Government data and studies**

The data provided by the Government is extremely valuable. The Hurt study, which led to many improvements in motorcycle safety, is now 30 years old. The MAIDS data, while being more recent, reflects European roadways, drivers/riders, and vehicle mix. A new, comprehensive US Crash Causation study that is MAIDS-compatible and internationally accepted is considered critical to future safety improvements.

The Harley-Davidson Approach to Motorcycling Safety

- Data driven
  - Enables issues to be quantified objectively
    - Is it really a problem or is it conjecture?
    - Is it the root cause, or a recurring symptom?
  - Enables more complete description of the situation
    - Frequency of occurrence under different conditions
  - Allows powerful tools to be leveraged to evaluate proposals, using representative conditions
    - Example – realistic computer simulations
    - Limits risk to test subjects / evaluators
    - Faster data collection

Obstacles to Development

- Lack of availability of representative data
  - Funding of motorcycle studies since the Hurt report
  - Compatibility of US data with MAIDS, others
  - Methods / systems to measure effectiveness
- Misinformation
  - Accuracy of governmental data (e.g.: FHWA VMT)
  - Definition of “motorcycle accidents”
    - MAIDS indicates 62.2% of accidents involving Powered Two Wheeler’s (PTW’s)* had primary contributing factors other than the PTW or its rider
  - Knowledge of motorcycle vehicle dynamics
- Conflicting global regulations
  - US vs. UN, others

*The term “powered two-wheeler” includes all types of road motorcycles, mopeds and mofas.

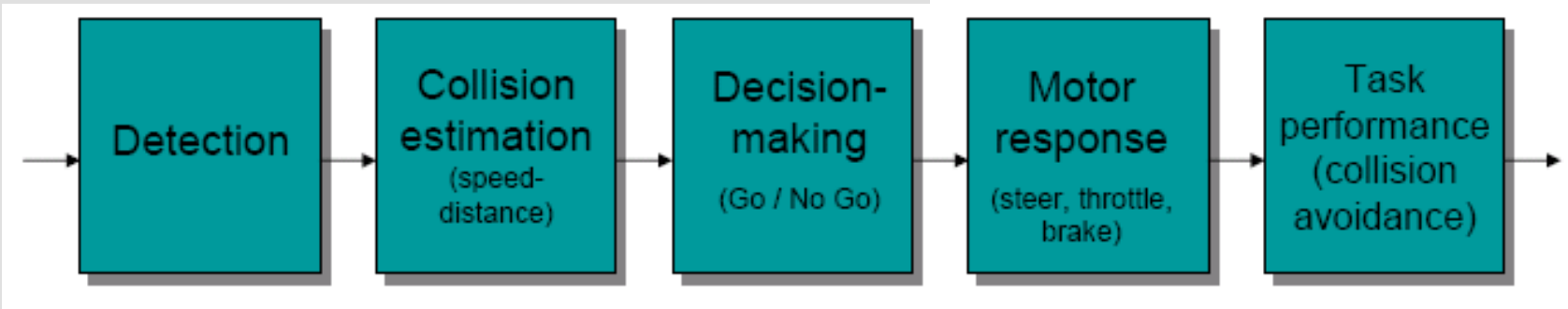
Case in Point: Conspicuity / Lighting

- Motorcycle Conspicuity has been identified by several countries & markets, including the U.S. and E.U.
- What is “Conspicuity”?
  - Webster’s: the quality or state of being

    1 : obvious to the eye or mind <*conspicuous* changes>
    2 : attracting attention

  - NASA MIDAS model:

Hart et al (1997), NASA MIDAS model



Conspicuity Data Available

- Hurt data, 1981; MAIDS data, 2004
  - Common significant findings of the two reports

Accident Condition	**Hurt Report** (% of all PTW accidents)	**MAIDS** (% of all PTW accidents)
Daylight	75	73
Clear Weather	84	90
Two-vehicle collision	75	80
Bearing of OV from PTW, 11 to 1 o'clock	77	71

- NHTSA Conspicuity Study
  - Final report not yet released
  - Preliminary findings do not identify any lighting treatments studied as statistically significant improvements
  - Visibility and Comfort of treatments inversely related (glare issues).
  - Behavioral study shows car drivers make left turn in front of motorcycles with ~ 12% less “gap”
  - Point of interest: Canadian drivers accepted a larger gap than US drivers

Lighting Regulations

- US FMVSS 108
  - Specifies minimum required lamps and installation requirements
  - Allows optional lighting if it does not “impair the effectiveness” of required lighting devices
- US State Regulations
  - Nearly half of the states require daytime headlamp use
  - Per FMVSS 108 and SAE, dedicated Daytime Running Lamps (DRL’s) must automatically turn off when headlamps are on
- UN / ECE Regulations
  - Specify minimum required AND maximum allowable lamps, and installation requirements
  - NO other lamps may be installed
  - DRL’s are not allowed on motorcycles
- Photometrics and colors of DOT/SAE approved lights are not completely consistent with ECE counterparts
- Installation requirements are not completely consistent
  – Recent FMVSS 108 changes will align with ECE car standards that are substantially challenging to many motorcycles.

Conspicuity - Technical Challenges

- Lighting treatments must:
  - Provide effective road illumination
  - Effectively signal intent / actions to other road users (stop, turn)
  - Enhance “detection” by other road users in all ambient conditions, including daylight, while avoiding glare
  - Comply with relevant regulations in each market
  - Be able to be fitted to motorcycles and withstand the environment to which they will be exposed
    - Heat, vibration, weather, etc.
  - Meet the demands of the consumer
    - Durability, cost, styling

Other Considerations

- Multiple conspicuity solutions may be required to address a perceived motorcycle vehicle design issue due to regulatory requirements.
- According to the Motorcycle Industry Council, there were 8.8 million motorcycles in use in the US in 2003, with ~ 1 million new vehicle sales that year.
- Many motorcycles remain in service for very long periods.
- The impact of new technologies, even if available today, may not be significant for many years, or as effective as other solutions such as training and education campaigns for Other Vehicle drivers.

Other Considerations - MAIDS

Primary accident contributing factor	Percent
Human – PTW rider	**37.1**
Human – OV driver	**50.4**
Vehicle	0.7
Environmental	**7.7**
Other failure	4.1
Total	100.0

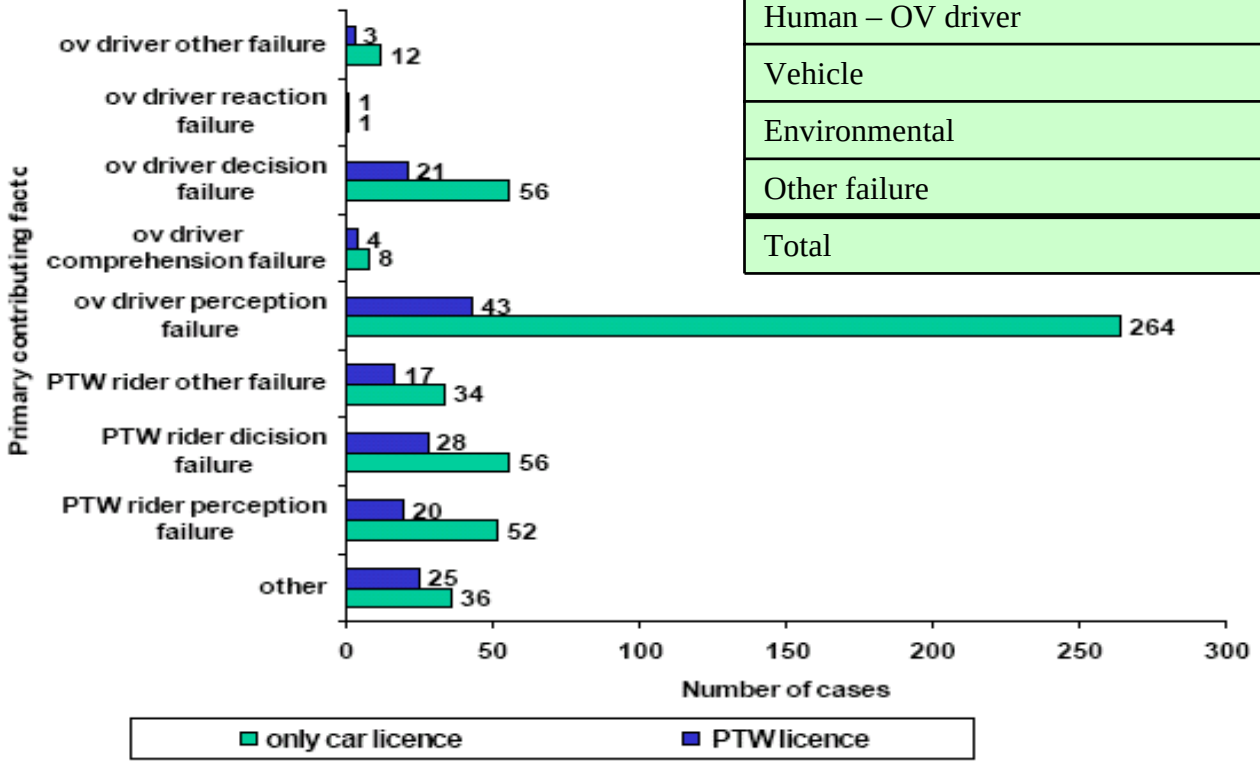


Figure 7.8: Cross-tabulation of primary accident contributing factor by OV driver's licence qualification
(Note: 33 cases unknown, 6 cases coded as none, 55 cases coded as other/not required)

Conclusion

- Harley-Davidson is committed to promoting safety in the motorcycling experience.
- In order to accomplish this, vehicle design is a critical element, but one that cannot be isolated from the environment in which vehicles operate, or without consideration for the behaviors of riders and those of the drivers around them.
- By relying on data, proper analyses of the motorcycling experience can be performed and opportunities for the most effective and significant improvements identified. We are hopeful that the soon to be performed FHWA Crash Causation study will be properly executed and significantly add to the data available in the US.
- Through our activities, we work to improve vehicle designs that will be both accepted in the market as well as compliant with the applicable regulations.